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PARIS-SACLAY



UMR0518

INRAE, AGROPARISTECH

## Applied Mathematics and Computer Science Paris-Saclay (MIA Paris-Saclay)

### Mission and objectives

MIA Paris-Saclay gathers statisticians and computer scientists specialized in modelling, statistical and computational learning for biology, ecology, environment, agronomy, and agri-food. Their skills cover statistical inference methods (complex models, latent models, Bayesian inference, learning, model selection...), and algorithmic methods (generalization, domain transfer, knowledge representation...).

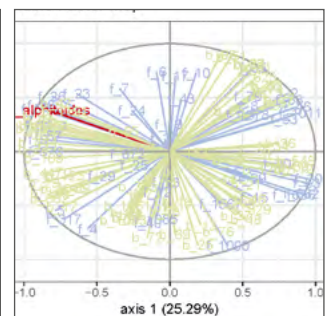
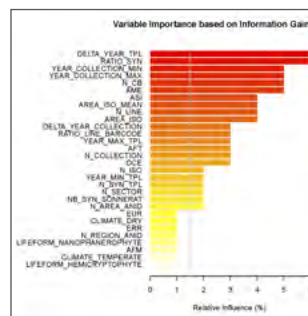
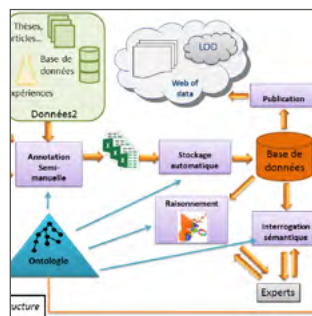
The unit develops statistical and computational methods that are generic or motivated by specific questions in life sciences. Its activities are based on a good knowledge of the target disciplines: ecology, environment, agri-food, molecular biology, and systems biology.

### Management

Julien Chiquet, director  
Sophie Donnet, deputy director

### Key figures

- 28 researchers and teacher-researchers
- 25 PhD and post-doctoral students
- 6 engineers
- 4 technicians and administrative staff
- 6 invited researchers



Pictures: © MIA-PARIS

MIA-Paris is constituted by two teams:

- SOLsTIS (Modeling and Statistical Learning for the Environment and Life Sciences),
- EkINocs (Expert Knowledge Interactive modelING and learnING for understandING and decision making in dINamic Complex Systems).



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**T** Digital Sciences &  
Systems Modelling

Topic

## Research

- Their activities rely on expertise in artificial intelligence, statistics, optimization, and visualization. The applications are particularly motivated by decision support for digital agriculture, addressing climate change, biodiversity, societal expectations, helping with changes in practices and consumption, and better understanding interactions from cells to territories.
- In computer science, research focuses on representation learning, generative models, recommendation methods, online learning and decision-making, task transfer, and multi-objective optimization.
- Study climatic, ecological, and environmental risks and develop statistical methods to address questions in these domains with increasingly complex data and structures.
- Develop and disseminate statistical modelling and learning methods to analyze data from metagenomics, genetics, and metabolomics.
- Enable the exploitation of data from multiple and heterogeneous sources, even on streams, based on an informed choice of multi-scale semantic representations, to contribute to the enhancement of expert knowledge, in the field of life sciences and food.

## Collaboration

MIA Paris-Saclay develops multiple collaborations with mathematics, statistics, and computer science research laboratories, at the regional level (MaIAGE, Lamme, LMO), mainly in Paris-Saclay within the framework of the FMJH foundation and the DataIA Convergence Institute, but also in Ile-de-France (MAP5, LPSM Sorbonne University), at the national level (universities of Toulouse, Montpellier, Rennes, Strasbourg, ENS Lyon) and at the international level (Imperial College, Tokyo University, Duke University, Columbia University, BOKU and SIG in Vienna, Austria, Technische Universität Braunschweig, ICTV and German Institute of Food Technologies (DIL) in Germany, Politecnico di Torino in Italy, Utrecht University in the Netherlands, ETH Zurich in Switzerland) to name a few.

The unit maintains close relations with laboratories of biology, ecology, environment, agribusiness in relation to the applications dealt with: IJPB, GQE, IPS2, LSCE in Paris-Saclay, MNHN, Pasteur, Institut Curie.

Partnerships with private companies such as Sanofi, EdF, Orange, Danone, Société du Canal de Provence, Exact Robotics, SofiProteol are regularly established through Cifre theses and through the H@rvest Chair.

## Teaching

The unit's lecturer-researchers provide basic training and specialization in statistics and computer science for AgroParisTech engineers, in particular managing the Information Decision by Learning Analysis (IODAA) specialty. The researchers and lecturer-researchers are involved in several master's programs at the University of Paris-Saclay, including Mathematics for Life Sciences (MSV), Artificial Intelligence, Bioinformatics and Ecology and Biodiversity Evolution, and regularly organize training sessions in statistical modelling for several doctoral schools.



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